PLANNING FOR KING COUNTY METRO'S LEED® PLATINUM BUILDING

Project Overview

Aerial view of Atlantic/Central Metro Base

King County Metro is planning a new operations building at their Atlantic/Central Metro Base, located in Seattle's Duwamish neighborhood. The project entails constructing an approximately 50,000 square foot building to serve as the operations base for Metro's bus drivers, dispatch services, and administrative staff.

King County established a policy in 2001 requiring new construction project teams to apply LEED[1] criteria in the pre-design and design phase of projects, and has encouraged teams to seek the highest LEED certification possible for each project. In addition, the County recently issued an executive order to reduce our dependence on non-renewable energy. The renewable energy order requires that 50% of King County's total non-transit energy use come from renewable energy sources by the year 2012[2].

Tetra Tech KCM, Inc., a multi-disciplinary design firm, is the lead design consultant for the Atlantic/Central Base Operations Complex (ACOC). From the early stages of the project, Tetra Tech embedded sustainable design strategies in the project's design approach. To inject more sustainable design ideas into the project, Tetra Tech hired O'Brien & Company, Inc. (O'Brien & Co.) to facilitate a series of sustainable building/LEED workshops. Members from the design team, King County Metro, and the County and City's Green Building Teams participated in a workshop series exploring the sustainable design considerations for creating a healthy workplace, utilizing site and water resources wisely, and optimizing the project's energy systems. At the final workshop, the participants reviewed the ideas that were generated and created LEED Silver, Gold, and Platinum plans for the project. After a presentation to the County, the project was given the direction to achieve LEED Platinum. The team is currently developing the design for what might be the County's first LEED Platinum building.

Ingredients for Success

Although developing a LEED Platinum building is no small task, the project team incorporated the following strategies early in the process to increase the likelihood of this accomplishment:

- ***Build a Strong Client/Consultant Relationship*** – The best way to ensure that a design meets the client's expectations is to involve the client and the eventual building occupants in the decision-making process. The LEED workshop series successfully brought the design team and representatives from King County Metro's management and staff team together to brainstorm sustainable design strategies for the project.

[1] LEED® is a registered trademark of the US Green Building Council's Leadership in Energy and Environmental Design Green Building Rating System®, hereafter referred to as LEED.

[2] The Atlantic/Central Base Operations Complex is considered a non-transit energy use.

- ***Hire a LEED Consultant*** – The role of a LEED consultant is to help project teams set realistic sustainable design goals early in the project and then help teams translate their goals into reality by recommending appropriate sustainable building technologies & materials and overseeing the LEED documentation process. For the ACOC, O'Brien & Co. has the dual role of leading and shadowing the project's pursuit of a highly-sustainable building. At the start of the project, O'Brien & Co. led the team through the LEED workshop series. Following the workshops, O'Brien & Co. "worked behind the scenes" as an independent reviewer of the project's approach to LEED credits and then recommended ways to improve the achievability of the targeted credits. O'Brien & Co. will continue to support the team with LEED specification reviews, LEED documentation, and construction coordination.
- ***Learn from Others*** – With the growing number of certified LEED buildings already constructed in the Pacific Northwest, opportunities for sharing the pros and cons of sustainable building systems and materials abound. During design development, the ACOC team toured examples of innovative sustainable design projects and met with owners, operators, and occupants of LEED buildings to gain insight on the benefits and drawbacks of sustainable building components.
- ***Consider all LEED Points at the Start of the Project*** – To achieve a LEED Platinum building, the design must fulfill the requirements of 52 out of 69 possible points. Early in the process, the ACOC team's approach was to consider all 69 points. Then, the team analyzed the costs and benefits of achieving each LEED credit and prioritized the value of each credit. The advantage of this approach is that it allows the team to think creatively about how the project can achieve the highest level of LEED before eliminating any options. The project is currently pursuing 59 LEED points.

King County Executive Order on Renewable Energy

In 2006, King County Executive, Ron Sims, signed three executive orders to reduce global warming. The executive orders outline goals and actions relating to land use, environmental management and renewable energy.

> *The renewable energy order requires that at least:*
>
> - *50% of King County's total non-transit energy use comes from renewable energy sources by the year 2012*
> - *35% of transit energy use comes from efficiencies and renewable energy sources by the year 2015*
> - *50% of transit energy use comes from efficiencies and renewable energy sources by the year 2020*

The renewable energy executive order challenges facilities to reduce energy consumption, generate on-site renewable energy, and purchase green power. The renovation and expansion of ACOC creates an excellent opportunity to incorporate the energy performance goals of this executive order.

In addition, King County's policy for new construction requires project teams to apply LEED criteria in the pre-design and design phase of projects, and encourages teams to seek the highest LEED certification possible for each project.

LEED Workshop Series

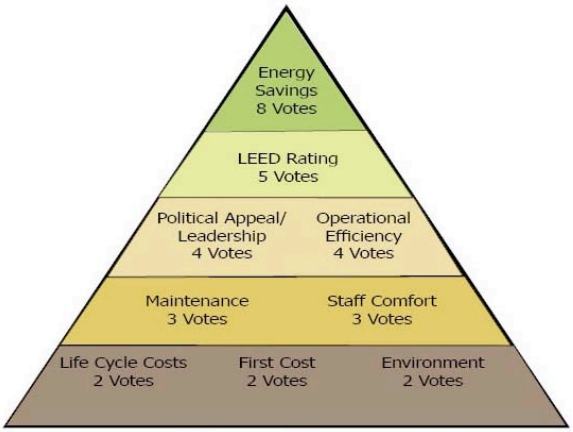
Elizabeth Powers of O'Brien & Company facilitating the LEED Plan Workshop

The purpose of the workshop series was to bring together key members from Tetra Tech's design team and Metro's staff to brainstorm sustainable design strategies for the project and explore varying degrees of LEED rating achievement for the project. Workshop participants included Tetra Tech design team members, King County Metro engineers, facilities managers, project managers, and members from the County and City's Green Building Team.

O'Brien & Company facilitated the four-part workshop series. The first three workshops were organized by overarching sustainable design themes; Well-being, Site & Water, and Systems. The Well-Being Workshop focused on achieving a healthy, high performance workplace. The Site & Water Workshop explored ideas that use on-site resources wisely and enhance the greater environment. The Systems Workshop concentrated on reducing energy consumption and generating on-site renewable energy. The grand finale workshop was the LEED Plan Workshop. During this workshop, participants used the culmination of ideas generated from the first three workshops to create LEED Silver, Gold, and Platinum plans for the project.

Priorities

To help guide the decision making process, workshop participants created a list of sustainable design priorities and then ranked them. The group gave "Energy Savings" their highest priority, which is in line with King County's Executive Order on Renewable Energy. The group's second priority was the level of LEED rating for the project. The "Political Appeal/Demonstration of County Leadership" and "Operational Efficiency" were tied for third place. Lower tiered priorities included "Maintenance," "Staff Comfort," "Cost," and "Stewardship of the Environment." Participants noted that creating an energy efficient building with a high LEED rating automatically fulfills the remaining priorities.



Pyramid of Sustainable Design Priorities from ACOC LEED workshop series

Going Platinum

With a clear understanding of the project's priorities, the workshop participants tested how their sustainable design ideas scored with LEED. The group reviewed all the sustainable design ideas that were generated during the workshop series and then created LEED Silver, Gold, and Platinum plans for the project.

Workshop participants developed a LEED Silver Plan through the promotion of alternative transportation choices such as bike accommodations, parking for fuel efficient vehicles, and close access to Metro bus stops. In addition, they committed to water conservation through water efficient landscaping and promoted the use of locally-sourced and recycled materials. The group's initial approach to energy savings was to create a building that is energy efficient by design, using strategies such as optimizing the building's solar orientation, insulating the building

beyond code standards, and shading the building with deep roof overhangs and trees. To further increase energy savings, the group recommended highly-efficient energy systems. To create a healthy work place, participants chose smart materials with low Volatile Organic Compounds (VOCs) and expressed the desire for natural daylight and views. With 35 "yes" credits, the Silver LEED Plan was a good start, but the group felt they could do better.

The group advanced to a LEED Gold Plan by retaining all the points in the Silver Plan, adding a green roof, and increasing the building's energy efficiency. The group discovered that the inclusion of a green roof offers many sustainable design synergies. Combined with ground-level landscaping, a green roof provides a valuable employee amenity, as well as earns LEED credits for restoring habitat, maximizing open space, integrating stormwater management with natural systems, and decreasing heat-island effect. The group's additions to the Gold Plan brought the score up to 50 "yes" credits, which is just on the verge of Platinum.

To elevate the plan to LEED Platinum, the group concentrated on optimizing the building's energy efficiency by introducing a ground-source heat pump - an underground closed-loop water system that uses the earth's relatively constant temperature as an energy source - and an underfloor air distribution – an underfloor area that delivers fresh air to occupants through adjustable vents in the floor. The group added onsite renewable power generation with photo voltaic panels on the roof. With these additions to the building design, the group had a solid plan for a LEED Platinum building with 59 "yes" credits.

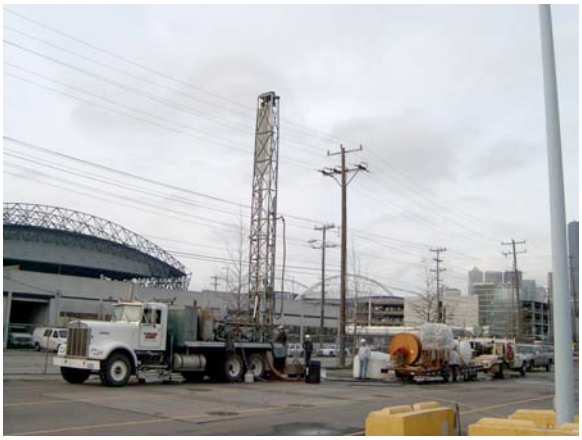
Integrating Sustainable Design Elements

With the team's commitment to achieve a Platinum building, the next step was to study their design ideas in greater detail. To ensure buy-in from all parties, four Technical Working Groups were formed with representatives from King County Metro and the consultant team. Each of these teams was tasked with researching and recommending sustainable design strategies for their topic area. The four areas of focus were:

- Energy Efficiency & On-Site Renewable Energy
- Green Roof
- Water Efficiency
- Occupant Well-being

Energy

The Energy Group investigated the options for heating, cooling, and ventilating the building efficiently. Through extensive research, the group concluded that a ground-source heat pump system offers four times the efficiency of a gas heating system. The group ordered ground-loop testing at the Atlantic/Central Metro Base to confirm that the site conditions were right for a ground-source heat pump system. The results came back in favor of this technology.



Ground-Loop Testing at Atlantic/Central Metro Base

The Energy Group also researched the appropriateness of an underfloor air distribution system and found that it offers a multitude of benefits including:

- Fresh air delivery to the breathing zone (occupant's seating/standing height)
- Individually adjustable vents for each occupant
- Flexibility for inexpensive remodels
- Reduced fan horsepower

Green Roof

The Green Roof Group studied the feasibility of a green roof for this project. Through research and tours of local green roofs, the group learned the pros and cons of the types of green roofs and maintenance requirements. The group confirmed that green roofs provide for a multitude of environmental benefits including:

- Restoring habitat
- Providing an outdoor retreat for Metro's employees
- Decreasing Heat Island Effect
- Reducing Stormwater Runoff

Water Efficiency

The Water Efficiency Group concluded that all the water-related LEED credits can be achieved with water efficient plumbing fixtures, such as one-gallon-flush toilets (conventional toilets can use up to three-gallons per flush) and low-flow faucets and showerheads. To further reduce water consumption, the group recommended establishing an irrigation-free landscape.

Well-being

The Well-being Group recommended ways to create healthy and attractive places for people to work such as providing operable windows, individual lighting and temperature controls, selecting low-emitting materials, and providing access to daylight and views. In addition, the group recommended providing informal gathering spaces for employees. A ground-level plaza, a central atrium, and roof-top patio would provide ACOC employees multiple spaces to relax, eat, enjoy nature, and converse with co-workers.

Making it Real – Translating Design into Reality

At the conclusion of the Technical Working Groups' investigation, leaders from King County and the consultant team collectively agreed on the sustainable building systems and materials, and then presented their proposal to the King County Management Team. This collaborative effort ensured early buy-in from the County on the project's sustainable design approach and will reduce the County's review time for subsequent design reviews.

As the team develops the design, O'Brien & Co. will help secure the LEED credits by assisting the team with material selections, reviewing credit calculations, and managing the LEED documentation process. During the construction document phase, O'Brien & Co. will review the project specifications to ensure the language enforces the LEED requirements. During construction, O'Brien & Co. will help the contractor to understand the necessary procedures and documentation for securing LEED credits.

Translating design into reality is not easy, but the ACOC team has laid the groundwork for success by:

- Establishing sustainable goals at the beginning of the project
- Involving the client team, the consultant team, and building users in the decision making process
- Researching sustainable building systems and materials
- Developing a LEED Platinum Plan
- Managing LEED documentation throughout the process

The State of Washington is a leader of the green building field with an inventory of 60 LEED certified buildings and many more projects that are pursuing LEED certification. Each project that gains LEED certification sets an example of how integrated sustainable design can increase energy efficiency, conserve resources, and provide healthy places to live, work, learn, and play. Due to their high visibility, public projects play a special role in transforming the green building market. By reaching for the highest level of LEED certification, ACOC hopes to demonstrate to both the public and private development sector that even within the constraints of a conservative budget, LEED Platinum certification is possible. It is made achievable by thoughtfully integrating sustainable design concepts early into the process and by carefully looking at true life cycle costs and benefits, rather than limiting analysis to first cost.